



Foreign Body Ingestion: Report of Two Cases

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Foreign body ingestion are commonly seen in children and mentally handicapped adults. Most foreign bodies pass through G.I tract without any problem. Metallic objects except aluminium, most animal bones except fish bones and glass foreign bodies are opaque on radiographs, whereas plastic and wooden foreign bodies are not opaque. Foreign body can simulate the appearance of medical device. It is important that all ultrasound, CT, nuclear medicine and MR images be interpreted in light of radiographs of the same region.

Oesophageal foreign bodies require prompt diagnosis and treatment. Patients who have symptoms of complete oesophageal occlusion and those who have ingested button batteries need urgent treatment. Main symptoms due to oesophageal foreign body are dysphagia, acute onset of pain, excessive salivation and choking. In case of suspected foreign body ingestion in children, symptoms are more notable during swallowing. Younger children may drool, vomit, refuse food or gag. Hematemesis and Cough are other symptoms.

Children most commonly ingest metal coins throughout the world. Hand Held Metal Detector (HHMD) has been found to be radiation free, cost effective and an accurate method in diagnosing and localizing coins ingested by children.

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Besides history and physical examination, radiology is a very important diagnostic tool in diagnosing and localizing ingested foreign body. Plain radiographs of cervical and chest region done in posteroanterior and lateral views help to identify foreign body and its location. Barium swallow examination is done in case of negative radiographs.

Two cases of foreign body ingestion has been reported in this article.

Case 1 is an adult male and case 2 a six year old female child. Both of them developed sudden chest pain, dysphagia, excessive salivation and choking after eating fruits. Diagnosis of foreign body oesophagus was made on barium studies and fruit seed was removed on endoscopy in both of them.

Aims of this article are to:-

1. Outline the evaluation of a patient who has ingested a foreign body.
2. Highlights various modalities for diagnosis of ingested foreign body.

Keywords: Fish bone; computerised; tomography; foreign body; barium swallow; endoscopy.

ABBREVIATIONS

CT Scan : Computed Tomography Scan
USG : Ultrasonography
MRI : Magnetic Resonance Imaging
HHMD : Hand Held Metal Detector
G.I. Tract : Gastrointestinal Tract
NPV : Negative Predictive Value
RAO : Right Anterior Oblique
NECT : Non Enhanced-CT
PA : Postero Anterior

1. INTRODUCTION

Most ingested foreign bodies pass through G.I. Tract without any problem. They can also simulate the appearance of medical device. It is important that all US, CT, Nuclear Medicine and MR images be interpreted in light of radiographs of the same region. Elongated or sharp objects like needles can be impacted at the site of intestinal narrowing or bending e.g. duodenal loop, duodenojejunal flexure, terminal ileum or area of bowel stricture. Metallic objects except aluminium, most animal bones except fish bones and glass foreign bodies are opaque on radiographs, whereas plastic and wooden foreign bodies are not opaque [1].

Oesophageal foreign bodies require prompt diagnosis and treatment. Proper description of type of ingested object, time passed since ingestion, location of object and associated complications should be noted. Patients who have symptoms of complete oesophageal occlusion and those who have ingested sharp and pointed object need urgent treatment to avoid complications. Button batteries are specially injurious in the oesophagus and should be removed promptly. Ingested coins may be

observed for sometime if in distal oesophagus as they may pass spontaneously, otherwise they should also be removed. Flexible endoscopy is modality of choice for management of oesophageal foreign bodies [2].

Conners & Mohseni [3] reviewed the pathophysiology of foreign body ingestion in children and outlined the evaluation of a patient who has ingested a foreign body.

Commonest complication of foreign body ingestion in children is obstruction of the object in the oesophagus. Foreign body may also become lodged anywhere in the G.I. Tract and may partially or completely obstruct G.I. tract leading to perforation. Younger patient with smaller anatomy, those with prior upper G.I. tract surgery or presence of congenital malformations are at higher risk. Thoracic inlet is most common site for obstruction. About 10-15% of foreign bodies are trapped in the mid oesophagus and some are trapped at the ileocaecal valve. Symptoms of foreign body ingestion in children may be more notable when swallowing. Younger children may drool, gag, vomit or refuse food. Hamatemesis and cough can be present. A foreign body trapped in the stomach or intestines cause abdominal pain vomiting or bloody stools. The provider must decide whether imaging is indicated. Plain radiographs of the region are usually sufficient, but affected patients may require more advanced imaging techniques such as contrast enhanced radiography or MRI Scanning. These patients may also be considered for treatment (e.g. endoscopy) without further imaging [3].

2. MATERIALS AND METHODS

Proper description of the ingested object was asked from the patient. Plain Radiographs of

cervical and chest region were done in PosteroAnterior and lateral views. Contrast swallow was done in case of negative radiographs after obtaining informed consent. A water soluble medium was used if perforation suspected.

Patient preparation was not needed.

Patient was examined in erect RAO position. A sufficient mouthful of barium was given to swallow and spot films of upper and lower oesophagus were taken.

After Care: The patient was advised to drink adequate volumes of water to avoid barium impaction and take laxatives if required.

Patient was also informed bowel motions will be white for a few days after the examination.

Case 1: An adult male developed severe pain in retrosternal region after eating mangoes. There was difficulty in swallowing, excessive salivation and choking. Plain radiograph of chest was normal. Barium swallow showed a 'hold up' due to an oval filling defect with a well defined concavity at the extremity of the contrast column. A thin streak of contrast was seen at the margin of the object. A diagnosis of foreign body oesophagus was made and mango seed (Gutli) was removed on endoscopy.



Fig. 1. Barium swallow showing an oval filling defect with a concavity at the extremity of the contrast column

Case 2: A six year old female child, suddenly developed pain in chest, dysphagia, excessive salivation and choking after eating fruits. X-Ray chest revealed no abnormality. An oesophagram was done with barium. A round filling defect was noted along

with deviation of the stream of barium as it passed over the object. A well defined concavity was noted at the end of the contrast column. A diagnosis of foreign body oesophagus was made and a fruit seed removed on endoscopy.



Fig. 2. Barium swallow showing round filling defect with a concavity at the end of contrast column

3. RESULTS AND DISCUSSION

The normal oesophagus has 3 areas of physiological narrowing, upper oesophageal sphincter, which contain cricopharyngeus muscle, the middle oesophagus at the level of aortic arch, and the lower oesophageal sphincter. 74% of foreign bodies are entrapped at the upper oesophageal sphincter level in children. 68% of obstructions occur at the distal oesophagus in adults with associated pathological conditions. More than 90% of serious complications are seen in children 5 years old or younger with button batteries ingestion 20 m.m. or more in diameter. Plain radiographs are 1st step if foreign body ingestion suspected. This will help in diagnosis of the object, its location and possibly complications. Posteroanterior and lateral views chest x-rays are usually sufficient. But x-ray of neck and abdomen may be needed depending upon clinical presentation. Flat objects like disc batteries, coins and bottle caps are normally oriented in the coronal plane in the oesophagus and appear round on the (PA) postero anterior view. If entrapped in trachea, they orient in the sagittal plane and look round on the lateral view. If a coin like circular object seen on the x-ray, it should be carefully looked for a 'halo' or 'double ring' appearance which is due to a button battery and should be removed immediately. Button batteries can be differentiated from coins with sensitivity, specificity and accuracy of about 80% on x-rays chest [4].

Athanassiadi et al. did a retrospective review of 400 cases of oesophageal foreign bodies management. There were 202 men and 198 women of age ranging between 1.5 to 95 years. The main complaints of patients were difficulty in swallowing, dysphagia, acute onset of pain and excessive salivation. Detailed history, oropharynx and hypopharynx examination and finally radiological examination were the diagnostic tools. The location of the FB was in cervical oesophagus 57% of cases, thoracic 26% and at the cardioesophageal junction in 17%. Besides history and physical examination, radiology was found very important diagnostic modality to identify and localize the foreign body. Some investigators has reported the efficacy of computed tomography especially in detection of fish bones but the authors did not support above opinion. Radiological examination was done in all their patients which included plain radiographs of oropharynx, neck chest in postero anterior and lateral views and when indicated barium studies. When there was radiolucent objects such as

wood, plastic or fish bones, barium coated cotton swabs were swallowed to clarify the presence of a foreign body and its location [5].

EKIM published a report on management of oesophageal foreign bodies in 26 patients (20 Children, 6 adults). Age of the patients varied between 6 months to 70 years. Main symptoms due to oesophageal foreign bodies were dysphagia, acute onset of pain, excessive salivation and choking. Plain radiographs postero-anterior view of oropharynx, neck, chest and abdomen and lateral neck were done in routine. Foreign bodies were most commonly seen in cervical oesophagus, usually below cricopharyngeous (16 Children), midesophagus 6 (4 children, 2 adults) and distal oesophagus 4 (all adults) Foreign bodies were extracted under general anaesthesia with the help of rigid esophagoscope which was considered safe method for foreign body removal [6].

In majority of patients, plain radiographs of cervical and chest region done in posteroanterior and lateral view are helpful in the diagnosis of ingested foreign bodies. In case of negative radiological findings, computed tomography (CT) should be performed. CT has been found very sensitive in diagnosing foreign bodies and also in localizing complications like perforation, vascular-oesophageal fistulas [7].

Varga et al. analysed the complications after button battery ingestion in children. Button batteries ingestion in children caused severe complications, affected organ and were fatal. Battery of 20 m.m. or greater in size caused more complications. Children younger than 6 years were most prone to injury with lithium batteries of 20 m.m. or greater. The oesophagus was most affected organ. Vascular involvement often proved fatal [8].

Jahshan et al. [9] performed a prospective study of adult patients to establish clinical criteria for CT scan evaluation of upper digestive tract fish bone and divided the patients into two groups 1) High Clinical suspicion group having one of the following criteria: drooling, accumulation of saliva in the pyriform sinus, fever, referral 24 hours after the ingestion with worsening and continuing symptoms and readmission. Non enhanced CT scan (NECT) of the neck was performed in these cases. 2. The second was a low clinical suspicion group, which included patients discharged without any NECT examination. These patients were followed up after 1 week

and 3 months. The negative predictive value and sensitivity were found 100% Positive predictive value was 28.5% and specificity 65%. They concluded that a NECT could be spared in about 75% of cases with the clinical criteria thus reducing unnecessary ionizing radiation, costs and stay in the emergency department [9].

Foreign body ingestion by children is common worldwide and metal coin is most commonly ingested. Complications of unidentified coins in the oesophagus consist of perforation, mediastinitis, tracheo-oesophageal fistula and sudden death. Absence of symptoms does not exclude the presence of an impacted coin and radiological investigation often done to detect them. The use of a metal detector as an alternative to standard radiographs to detect presence of absence of metal foreign bodies has been advocated for more than 30 years. Lee et al. did a systemic review of prospective studies performed to assess the ability of Handheld Metal Detector (HHMD) to diagnose the presence or absence of ingested coin in children (17 Years or younger). Review was done to assess whether use of a HHMD could safely reduce the number of radiographs done in cases of coins ingested by children. Accuracy of coin localization on metal detector screening was confirmed by chest radiographs and serial radiographs till coin was located or excluded. Over all Sensitivity of HHMD in detecting presence of coins was 99.4% and accuracy at localisation was 99.8%. Authors found use of HHMD an accurate, radiation free and cost effective method for diagnosing and localising coins ingested by children [10].

Arana et al. observed that management of ingested foreign bodies in children was not standardised. Out of 325 cases of accidental ingestion of foreign bodies, a minority 28 (9%) were removed with a Mc Gill forceps, 65(20%) were removed with a magnet probe and 82 cases (25%) with endoscope. Majority of cases 150 (46%), showed natural elimination. Author proposed a community paediatrician for management of accidental ingestion of a foreign body in children [11].

Libanio et al. [12] performed a prospective study in adults patients with foreign body ingestion and suspected food impactions to assess clinical outcomes and to identify predictors of foreign body presence at the time of endoscopy. In total 521 patients were included in the study. History of foreign body ingestion was present in 320

patients and suspected food impaction in 201. Food impaction was significantly seen more in older patients and was more frequent in whom history of oesophageal disease was present. The foreign body were found in upper digestive tracts in 43% of the patients. Food impaction was confirmed in 87%cases. The authors concluded that due to high proportion of patients with foreign body at endoscopy and the low risk of complications, endoscopic evaluation was justified in majority of cases [12].

4. CONCLUSIONS

Most ingested foreign body pass through G.I. tract without any problem. They can also simulate medical device. The main symptoms of ingested foreign body are difficulty in swallowing, dysphagia, sudden onset of pain, excessive salivation. Younger children may gag, drool, refuse food or vomit. Symptoms are more notable during swallowing. Radiology is a very important diagnostic modality to identify and localize the foreign body. Plain radiographs of cervical and chest region done in posteroanterior and lateral views are helpful in diagnosis of ingested foreign body in majority of patients. Barium studies are done when indicated. Barium coated swabs are used to clarify and localize a radiolucent objects such as wood, plastic or fish bones. Children most commonly ingest metal coins worldwide. Hand Held Metal Detector (HHMD) has been found to be an accurate, radiation free and cost effective method in diagnosing and localizing coins ingested by children.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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